

## PATENT COOPERATION TREATY

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## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference JL/ARB/21711	<b>FOR FURTHER ACTION</b>	See Form PCT/PEA/416
International application No. PCT/GB2004/002977	International filing date (day/month/year) 09.07.2004	Priority date (day/month/year) 11.07.2003
International Patent Classification (IPC) or national classification and IPC H05K13/04, H05K9/00		
Applicant ARKA TECHNOLOGIES LIMITED		

1. This report is the International preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
  - a. ☒ sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:
    - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand  11.05.2005	Date of completion of this report  29.09.2005
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  Bolder, G  Telephone No. +31 70 340-3636  

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/002977

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**Box No. I Basis of the report**

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1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

3-10	as originally filed
1, 2	filed with telefax on 11.05.2005

**Claims, Numbers**

1-10	filed with telefax on 11.05.2005
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**Drawings, Sheets**

1/7-7/7	as originally filed
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- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VII Certain defects in the international application**

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The following defects in the form or contents of the international application have been noted: ..

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

Reference is made to the following documents:

D1: EP-A-0 755 177 (MOLEX INCORPORATED) 22 January 1997 (1997-01-22)

D2: US-A-6 051 781 (BIANCA ET AL.) 18 April 2000 (2000-04-18)

**1 INDEPENDENT CLAIM 1**

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and shows:

A printed circuit board assembly comprising a PCB and a component mounted thereon, wherein the PCB and component are releasably secured to one another by securing means, characterised in that said securing means comprises a resiliently flexible and sprung biased clip member

1.1 The subject-matter of claim 1 differs from this known assembly in that at least one slug is secured to the PCB.

1.2 The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

1.3 The problem to be solved by the present invention may be regarded as how to easily attach a component to a PCB without soldering.

1.4 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The prior art shows flexible locking arms (D1) or metal clips (D2) for attaching components to a PCB without soldering. Using slugs on the PCB as proposed in the present application is not obvious and is neither taught nor indicated in the prior art.

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(SEPARATE SHEET)**

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**2 DEPENDENT CLAIMS 2-9**

Claims 2-9 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

**Re Item VII**

**Certain defects in the international application**

**1 INDEPENDENT CLAIM 10**

Claim 10 contains a reference to the drawings. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here.

Claim 10 therefore should be deleted.

# PRINTED CIRCUIT BOARD ASSEMBLY

The present invention relates to printed circuit board (PCB) assemblies and particularly, but not exclusively, to a system for shielding components from radio frequency interference (RFI) and more particularly to a system for shielding surface mounted devices (SMD).

It is well known in the design of electrical equipment to reduce the undesirable affects of RFI by shielding components mounted on a printed circuit board (PCB) with a shielding can manufactured from an electrically conductive material such as beryllium copper. This type of shielding can has hitherto been traditionally mounted to a PCB with surface mounting techniques such as soldering. However, a problem associated with these techniques is that, once secured in position on a PCB, a shielding can cannot be readily removed. As a consequence, the replacement or repair of devices covered by the shield is considerably complicated. Any subsequent redesign of a PCB provided with a shielding can is also complicated and expensive.

It is an object of the present invention to provide a system for allowing a component to be releaseably mounted to a PCB. More particularly, it is an object of the present invention to provide a system for allowing a shielding can to be removeably mounted to a PCB.

A first aspect of the present invention provides a printed circuit board (PCB) assembly as recited in the appended independent claim 1. An assembly comprising further novel and advantageous features is provided as recited in any of the appended dependent claims 1 to 9.

Described hereinafter is a printed circuit board (PCB) assembly comprising a PCB and a component mounted thereon, wherein the PCB and component are releaseably secured to one another by securing means; characterised in that said securing means comprises a resiliently flexible and sprung biased clip member secured to one of the PCB and said component; and first and second surfaces provided on the other of the PCB and said component, said first surface being arranged to cam and thereby resiliently flex said clip member in a first direction against the bias of the clip member when the PCB and said component are initially pressed together during assembly, and said second surface

being arranged so as to allow said clip member to move, by means of said bias, in a second direction opposite to said first direction when the PCB and said component are further pressed together, said clip member thereby latching on said second surface so as to provide resistance to the PCB and said component being disassembled.

The PCB and said component may be secured to one another so that the clip member is sprung biased into abutment with said second surface. Furthermore, said second surface may be disposed at such an angle relative to the clip member that the spring bias of the clip member biases the PCB and said component toward one another when the PCB and said component are in abutment with one another.

Ideally, the securing means comprises a further resiliently flexible and sprung biased clip member secured to one of the PCB and said component, the further clip member being located so that the spring bias of the two clip members acts generally in a direction opposite to each other. It is particularly desirable for the clip members to be located substantially opposite one another so that the spring bias of each clip member acts generally in the direction of the other clip member. Ideally, the or each clip member is secured to one of the PCB and said component by virtue of the or each clip member being cut from the material of said PCB or component.

Furthermore, the or each clip member may be secured to said component, and said first and second surfaces may be provided on the PCB. Said component is preferably a radio frequency interference shield. The first and second surfaces may be provided on a slug which is originally discrete from the PCB and said component.

Also described hereinafter is a printed circuit board (PCB) assembly comprising a PCB and a component mounted thereon, wherein the PCB and component are releasably secured to one another by securing means, characterised in that said securing means comprises a resiliently flexible and sprung biased clip member secured to one of the PCB and said component; and at least one slug secured to the other of the PCB and said component and being originally discrete from the PCB and said component. The slug may have a cross-section taken perpendicular to the longitudinal axis of the slug which is quadrilateral, pentagonal, hexagonal, septagonal or octagonal in shape.

Embodiments of the present invention will now be described with reference to the accompanying drawings, in which:

## Claims:

1. A printed circuit board (PCB) assembly comprising a PCB and a component mounted thereon, wherein the PCB and component are releasably secured to one another by securing means, said securing means comprising a resiliently flexible and sprung biased clip member secured to said component; and at least one slug secured to the PCB and being originally discrete from the PCB and said component; characterised in that said component comprises an aperture for receiving a slug, and in that the clip member is arranged to abut the slug received by said aperture.
2. An assembly as claimed in claim 1, wherein the slug has a cross-section taken perpendicular to the longitudinal axis of the slug which is quadrilateral, pentagonal, hexagonal, septagonal or octagonal in shape.
3. An assembly as claimed in claim 1 or 2, wherein first and second surfaces are provided on the or each slug, said first surface being arranged to cam and thereby resiliently flex said clip member in a first direction against the bias of the clip member when the PCB and said component are initially pressed together during assembly, and said second surface being arranged so as to allow said clip member to move, by means of said bias, in a second direction opposite to said first direction when the PCB and said component are further pressed together, said clip member thereby latching on said second surface so as to provide resistance to the PCB and said component being disassembled.
4. An assembly as claimed in claim 3, wherein the PCB and said component are secured to one another so that the clip member is sprung biased into abutment with said second surface.
5. An assembly as claimed in claim 4, wherein said second surface is disposed at such an angle relative to the clip member that the spring bias of the clip member biases the PCB and said component toward one another when the PCB and said component are in abutment with one another.



6. An assembly as claimed in any of the preceding claims, wherein the securing means comprises a further resiliently flexible and sprung biased clip member secured to said component, the further clip member being located so that the spring bias of the two clip members acts generally in a direction opposite to each other.

7. An assembly as claimed in claim 6, wherein said clip members are located substantially opposite one another so that the spring bias of each clip member acts generally in the direction of the other clip member.

8. An assembly as claimed in any of the preceding claims, wherein the or each clip member is secured to said component by virtue of the or each clip member being cut from the material of said component.

9. An assembly as claimed in any of the preceding claims, wherein said component is a radio frequency interference shield.

10. An assembly as hereinbefore described with reference to, and as shown in, the accompanying drawings.